Small Business Innovation Research/Small Business Tech Transfer

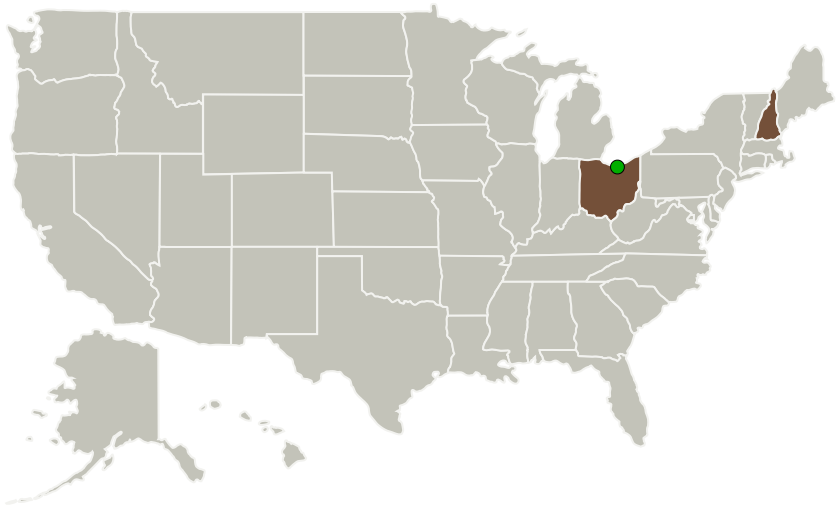
Ultra-Compact Heat Rejection System for Fission Surface Power, Phase I

Completed Technology Project (2015 - 2015)

Project Introduction

Radiator panels are the baseline approach for rejecting waste heat from NASA Fission Surface Power (FSP) systems. The required panels are very large, which makes them challenging to launch, deploy, support, and move. Panel performance may also be degraded by dust, radiation, insolation, and micrometeorite impact. In response, we propose to develop an ultra-compact heat rejection system for use on Mars and other planets and moons with atmospheric gas. This system will rely on forced convection rather than radiation heat transfer. It will decrease power system size and mass dramatically, which will make FSP more affordable and practical. Creare is well suited to succeed because we have a long history developing advanced turbomachines, heat exchangers, and thermal systems for challenging spaceflight applications. During the Phase I project, we will optimize design trades, complete a preliminary design, and conduct bearing evaluation tests. We will then fabricate and test a prototype system during the Phase II project.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Creare LLC	Lead Organization	Industry	Hanover, New Hampshire
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

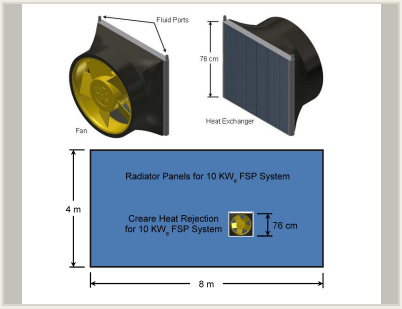


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Table of Contents

Ultra-Compact Heat Rejection System for Fission Surface Power, Phase I

Completed Technology Project (2015 - 2015)

Primary U.S. Work Locations	
New Hampshire	Ohio

Project Transitions

June 2015: Project Start

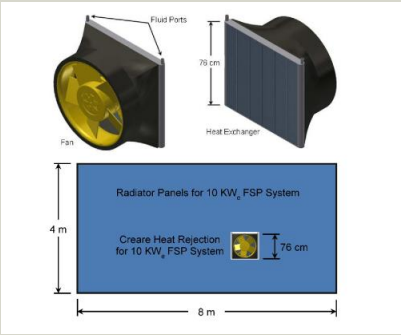
December 2015: Closed out

Closeout Summary: Ultra-Compact Heat Rejection System for Fission Surface Power, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/137314)*

Images



Briefing Chart Image
Ultra-Compact Heat Rejection System for Fission Surface Power, Phase I
(https://techport.nasa.gov/image/131741)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Creare LLC

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

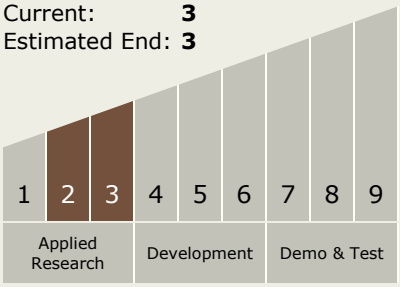
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Jeffrey J Breedlove

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.1 Power Generation and Energy Conversion
    - TX03.1.4 Dynamic Energy Conversion

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System